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ON PLAGUE-IMMUNE GERBILS

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THE MULTIPLICATION OF P. PESTIS IN FLEAS FEEDING
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Following is the translation of an article by V. A. Bibikova and A. I. Gavryushina (Alma-Ata), published in the Russian-language periodical Materialy Nauchnoy Konferentsii po Prirodnoy Ochagovosti i Profilaktike Chumy (Materials from the Scientific Conference on the Natural Focality and Prophylaxis of Plague), Feb 1963, pages 25-26. Translation performed by Sp/7 Charles T. Ostertag Jr./

Under the conditions of natural foci of plague fleas may feed not only on the blood of healthy or sick rodents, but, also on the blood of rodents which are immune to plague. In connection with this, there is interest in the problem that the blood of rodents which are immune to plague exerts an influence on the causative agent which is found in the fleas.

In the test 100 *Xenopsylla gerbil minax* fleas were used. These were fed on a great gerbil which was infected with a highly virulent strain of P. pestis 98, isolated from the fleas on great gerbils in the Panfilovskiy Rayon of Alma-Atinskaya oblast.

Another party of great gerbils was immunized with increasing doses of the plague microbe, (1 million, 10 million and 100 million microbial bodies), preliminarily inactivated at 56°C for 30 minutes. Some of the earlier infected fleas were fed on these gerbils. For a comparison another group of infected fleas was fed on healthy gerbils. All the fleas were kept at 11 to 22°C. We studied the intensity of multiplication of the microbe in the organism of fleas, the dynamics of blocking the gastrointestinal tract, and the seeding ability and virulence of the strains of causative agent after residence in the organism of fleas. We used individual seedings of fleas with dilutions up to 1:1,000,000. In the work we used the same series of agar, on which out of 100 microbial bodies 42 colonies grew, and out of 10 microbial bodies - 4 colonies of the plague microbe.

In our observations it was noted that the fleas fed just as willingly on immunized gerbils as on healthy gerbils. The life span of infected fleas, which had fed on immune blood, was greater than in fleas which were fed on the blood of healthy gerbils. The initial infectious state of the fleas was 40%.

In the investigation of the gastrointestinal tract of all the infected fleas during the process of the test, it turned out that in the first group (fed on immunized rodents) there were less microbes in comparison with the second group (fed on healthy rodents) - 358,760 microbial bodies in 1 flea as opposed to 2,187,390. Apparently the feeding on the blood of immunized animals led to the elimination of the microbes from the fleas. Thus, the percentage of infected fleas among those which lived for 19 days up to the end of the test comprised 55% in the first group and 100% in the second group.

The virulence was studied in 9 cultures, four in each group of fleas, and also in the initial culture No. 98 at the end of the test. The majority of the white mice perished on the 4th day. Mice which survived up to 10 days were sacrificed. The number of surviving mice turned out to be greater than the group which was infected with cultures from fleas which were fed on immune blood (4 mice against 1). This part of the observations bears an especially preliminary nature.